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ABSTRACT

An evaluation of group project activities in terms of participant acquisition of vocational skills and competencies was undertaken in secondary vocational and postsecondary vocational schools within Wisconsin and Minnesota. Questionnaires dealing with study objectives were administered to 234 students and 17 teachers involved in the activities, and on-site observations were made. Data were gathered from four basic groups: (1) a spinning wheel class, (2) personally visited classes, (3) classes not visited, and (4) teachers. Methods and procedures are examined. Data were analyzed, when possible, by computer, using weighted scope analysis. Results are presented, based on an examination of each group project's data in relationship to objectives, and conclusions are made. It was determined that group project activities in vocational education provide: productive learning experiences; palatable activities; measured increases in group interaction; and achievement beyond course criterion level and attainment of career information. It was also concluded that no unique skills were required of the instructor. Figures and tables supplement the text. Appended materials include: questionnaires, pre- and posttests, forms, correspondence related to the four basic groups, and group project activity schools involved in the research study. (LH)

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Final Report

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August, 1974

The research reported herein was performed with Federal Cuthack funds carried on in association with the Wisconsin Board of Vocational, Technical and Adult Education. The researcher was encouraged to express freely his professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official State Board or University of Wisconsin - Stout policy or position.

AN APPRAISAL OF GROUP PROJECT EFFECTIVENESS
IN VOCATIONAL SUBJECTS
CONDUCTED AS A PART OF
THE GRADUATE STUDENT RESEARCH
GRANT, PROJECT NO. 19-004-151-223

U.S. DEPARTMENT OF HEALTH,
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Keith Myers

Chapter 1
RATIONALE AND PROBLEM

Summary

The problem of the study was to appraise the effectiveness of group project activity in the acquisition of vocational skills and competence.

The data for the study were collected from a number of schools within the states of Wisconsin and Minnesota that were identified as using group project activity in teaching vocationally-oriented subjects. The participants in the study were the teachers and students who were involved in the group project activities. Questionnaires dealing with the objectives of the study were administered to all participants. Supplemental to the questionnaires were the observations made by the researcher during personal visits.

It was found that group project activity in vocational education provides a very meaningful and productive route in the preparation of the individual for gainful employment. Group project activity allows not only the teaching and learning of specific skills but also the acquisition of knowledge and experiences in social interaction and participation. The student receives firsthand the sights, sounds, and feelings of the real-life world. Learning within a group project activity does take place and provides for uniqueness and palatability that enhances the desire to learn. Group involvement and peer interaction play a significant role in determining the success of the group activity. The teacher must become involved with the group project activity with a sincerity of enthusiasm and a desire to commit himself to the success of the activity. Group project activity produces for the student a cohesiveness and sense of oneness that can be capitalized on by the instructor to bring about the instruction and experiences needed to produce effective, competent, and employable individuals.

Introduction

In vocational education there is always a need for realistic learning experiences. Since these learning experiences are designed to prepare the student for work, it would seem that they should be designed to replicate real-life activities in the work world. Group learning activities are one type of learning experience that can provide a real-life work situation in the classroom. Group learning activities in vocational education may prove to be of significant teaching value to the teacher, as well as a meaningful way of learning for the student.

The Problem

The problem of this study was to appraise the effectiveness of group project activity in the acquisition of vocational skills and competencies.

In the context of learning this implies that the participants are to gain knowledge and/or skill by the participation in studying, instruction, and experiences while working within a cohesive group.

The group, defined as three or more students, is involved in one specific objective as defined by or identified for that specific group. Large classroom groups can be divided into smaller sub-groups or left as one group depending on the objective that is to be undertaken. For instance, building an airplane may be the objective of the whole group whereas constructing the left wing panel may be the objective of a sub-group. That is to say group project activity is concerned with a group working collectively on one objective at one time.

The objective of all learning is the gaining of knowledge and/or skill. And, it is usually implied, that this gain is for the individual. In

group learning the gain is also individual but the acquisition of that learning is channeled through the group.

The individual within the group functions as part of a group by the simple fact that he is a part of the group. He does influence the total behavior of the group and is affected by the group. His individual achievements will be influenced by the group as will they affect the group.

The problem then, is to appraise this activity, which is identified as project activity, to determine its effectiveness in meeting the basic objectives of Vocational Education.

Objectives

The objectives of this study are:

1. To determine the impact of group learning activities on the attainment of course objectives.
2. To determine the palatability for students and teachers of group project activity as a learning experience.
3. To determine if the student acquires career information, performance beyond the course criterion level, and knowledge of group interaction through group project activities.
4. To determine those skills needed by the instructor to manage a group project activity.

Rationale

It is a generally accepted thought that vocational education is that part of education which makes an individual more employable. Evans (1) defined vocational education in more finite terms to include that the

individual was to be more employable in one group of occupations than in another. He believes that teaching for a group of occupations is better than a specific occupation. Logically, then, vocational education should gear itself to the teaching of broader concepts and skills in the occupational fields.

In the world of work the prospective employee can be quite well assured that he will be called upon to perform several tasks, not necessarily any one specific task. To go a little further, the world of work involves more than just doing mental or manual tasks. It involves working with fellow co-workers, decision making, and a personal commitment to the work.

Martenki (2) thought that work was something you did that interested you and that you could be paid for. She also talks about the role of education saying in effect that we as educators need to develop the whole person and not just the academic or vocational person.

It would seem then that vocational education needs to prepare the student completely for work, not just to perform a work task. Teachers will have to be more innovative. Klassen and Collier (3) tried to stress a need for innovation among all educators when they talked to a recent meeting of the International Council on Education for Teaching. Their talk emphasized a need to be more innovative and a need for improvement in education to make teachers and students more aware of the world about them.

Education does need to be improved and this holds true, it would seem, especially for vocational education. Evans (1) supports this need in improvement for vocational education, saying that a person needs to acquire both technical and social skills before he can become a member of a work group.

There is a need then, to provide more meaningful vocational education, a need to be more innovative, and a need to develop the students' social skills. In a recent Gallup poll (4) on public attitudes, people stated that what they wanted most out of education for their children was a route to better jobs and to help them (children) get along better with each other.

A person involved in the world of work is always interacting with his fellow man. In Evan's book (1) sociologists define work as a goal-directed group activity.

The key here is "group activity." Since vocational education is oriented to the world of work and since work has been defined as a group activity, it would seem that a logical way to teach and learn would be through group activity.

In reviewing the literature on group activities and group learning, it became evident that these approaches are helpful for education in general but little was found that dealt specifically with vocational education.

Beach (5) did some study on small group activities and his observations were that small group interaction combined with established values of traditional teaching techniques could produce an educational reference that was total, and not merely academic. In effect he was saying that the use of small groups cannot only accomplish the specific task or goal required from objective, but that it can provide additional, more rounded education for the student.

As was stated previously, there is a need in vocational education for more than just a technical skill. Since it is obvious that the technical skill has to be learned, perhaps group learning may even help achieve the

skill faster or better than traditional methods.

DeVries and Edwards (6) did some study with student teams (groups) and they found some favorable outcomes for vocational education. Using student teams resulted in greater student peer tutoring, and greater perceived mutual concern and competitiveness in the classroom.

A continued review of the literature indicaties that there is generally, support for group activity in education. However, very little is said about the specifics of group activity and how it can affect vocational education.

If the advantages of small-group interactions and learning can be coupled with the established values of the more traditional vocational instructional techniques, the resulting innovations are quite certain to be more productive of learning which produces changed persons and not mere machine-like operators or computer-type storehouses of information.

Hypothesis

1. Vocational course objectives will be attained using group project activity as the teaching/learning medium.
2. Group project activity will be a palatable process for learning according to the objectives of the course.
3. Knowledge of group interaction, achievement beyond the course criterion level, and career information will be obtained when using group project activity.
4. It will be determined that the skills required by the instructor to manage a group project activity are potentially intrinsic in vocational educators.

Definition of Terms

A Group will be defined as three or more students.

Group Project Activity will be considered that activity undertaken collectively by three or more students in an attempt to fulfill a single objective.

Learning using group project activity will be considered as the gaining of knowledge and/or skill by the participation in studying, instruction, and experiences within a cohesive group working on a single objective.

Vocational Education will be defined as that education that prepares an individual for gainful employment in the world of work.

CHAPTER 2

METHODS AND PROCEDURES

Introduction

The data for this study were collected from a number of schools within the states of Wisconsin and Minnesota that were identified as using group project activity in teaching vocationally-oriented subjects.

Because a relatively large number of schools were identified only a sample could be chosen for personal observation and testing by the researcher. Those schools not visited were contacted by mail and were used to provide useful general data on group project activity.

Population

The population identified for this study was schools offering secondary or post-secondary vocational classes that were known to be using group project activity as the primary tool in the teaching/learning situation. Those schools identified for personal visitation, observation, and testing included two secondary capstone classes in building construction, a vocational-technical school class in wood techniques, a secondary school group in a special-interest class of the aerospace-aviation career field and a university level class dealing with spinning wheel fabrication and use.

Other schools identified and used in this research, but not visited by the researcher also fell into the secondary vocational and post-secondary vocational school classification. The schools used range in location from north central Minnesota to southeast Wisconsin.

Identification of all their participants was carried out through correspondence with State educational leaders, district administrators, university faculty and people associated with educational improvement (Appendix A).

Instrumentation

All instruments used in gathering data for this report were designed by the researcher to gather specific data as required by the objectives outlined for this research.

There were basically four groups from which data were gathered; (1) the class working with the spinning wheels, (2) the classes involved with projects that were visited personally, (3) the classes not visited by the instructor and (4) the teachers of all classes used in this report. Table 1 illustrates these groups.

The spinning wheel group was the first group to be tested. Since the researcher was able to become involved directly with the class from the very start it was decided that a pre- and post-test would be used to collect the necessary data (Appendix B). To supplement the pre- and post-tests daily personal visits and student interviews were conducted.

The pre- and post-tests were identical in construction. To identify each test participant and yet help them remain anonymous, a system of letters and numbers were used.

The pre- and post-tests were designed to determine if the course objectives had been attained; palatability exisited for the student; and if career information, performance beyond the course criterion level, and knowledge of group interaction had been attained. Table 2 shows the various

TABLE 1
Groups Identified

Group #1

Spinning Wheels

University of Wisconsin-Stout

Group #2

Schools Visited

Peguet Lakes Vocational Center
Oshkosh West High School
Bloomer High School
Mid-State Technical Institute

Group #3

Schools Not Visited

Madison Area Technical College
Northwestern High School
Cochrane-Fountain City High School
Milwaukee Technical High School
Seymour Community High School
North Central Technical Institute
Lakeshore Technical District
Waukesha County Technical Institute
Bay View High School

Group #4

Instructors

Dr. Henry Thomas
Dr. Kenneth Heintz
Mr. Curtis Johnson
Mr. S. Scoville
Mr. Peterson
Mr. Larry Van Handle
Mr. B. Whitt
Mr. William Dirks
Mr. Barry Nelson
Mr. T. J. Teschendorf
Mr. Herbst
Mr. Kenny
Ms. Witerfedlt
Mr. Krueger
Mr. Giachino
Ms. Pat Schoenherr
Mr. Gerald Hoover
Mrs. Kathy Carney
Mrs. Eva Repphun
Mrs. Mary Denison
Mr. Harvy Schmack
Mr. A. A. Anderson
Mr. M. M. Tibbetts

instruments used in gathering all data for this research and their correlation to the objectives of the study.

The two instructors handling the spinning wheel class were given questionnaires to identify those skills needed by educators to manage group project activities (Appendix F). This basic questionnaire was given to all the teachers identified in this report.

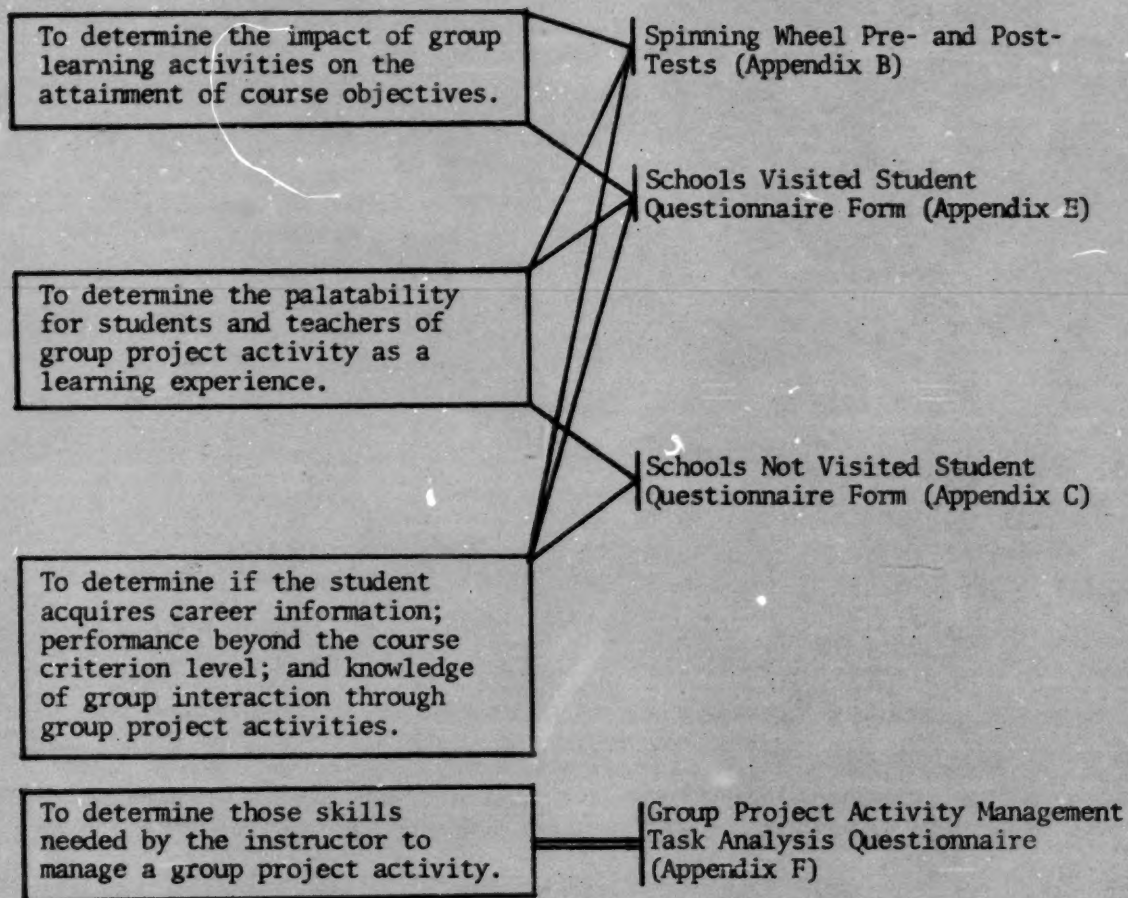
The pre- and post-tests as well as the teacher questionnaire were designed to be computer analyzed by a prewritten computer program.

From the large group of schools identified as using group project activity four were picked for visitation, observation and testing based on their interrelation in geographical location with regard to travel time and convenience as determined by the researcher. This group was designated "schools visited." The rest of those identified were designated as "schools not visited."

Students in schools designated as "schools visited" received a questionnaire pertaining to their specific group learning activity (Appendix E). These questionnaires were designed to meet all of the research objectives except the one dealing with and pertaining to instructor management of group project activity (Table 2).

The questionnaires asked that the student give two responses to each question, one reflecting his thoughts retroactive to the beginning of the course, and one reflecting his present attitudes. Some of the questions dealt with opinions and attitudes while others dealt with specific cognitive knowledge. The instructors of this group were asked to fill out a task analysis questionnaire (Appendix F). These questionnaires were also designed to be computer analyzed.

TABLE 2
Correlation of Instruments
and
Research Objectives



The student group designated as "schools not visited" received a questionnaire dealing largely with the collection of opinions and attitudes pertaining to the objectives of student palatability, knowledge of group interaction, career information, and performance beyond course objectives (Appendix C). Again the questionnaires for this group were designed for computer analysis.

All the teachers identified in this group who had experience in managing group project activity were given a task analysis questionnaire (Appendix F) for the purpose of identifying those skills needed to successfully manage a group project activity. These forms were analyzed by a prewritten computer program.

All questionnaires used in this report were designed for the specific purpose of collecting data in reference to the objectives set down for this report. All questionnaire data were run through a computer for analysis.

Procedure for Collecting Data

In the initial attempt to identify schools within the Wisconsin-Minnesota perimeters, several sources of information were utilized. A letter explaining the need to identify schools using group project activity (Appendix A) was sent to: Mr. Richard Kitzmann, Bureau of Manpower Development, Department of Instruction, Madison, Wisconsin; Mr. Ronald Johnson, State Department of Education, St. Paul, Minnesota; and Mr. Ben Owen, Project School Flight, Experimental Aircraft Association, Hales Corners, Wisconsin.

From these people leads on several Group Project activities were obtained and a second letter (Appendix A) was sent to those people identi-

fied. In addition this same letter was sent to all the Wisconsin Vocational, Technical and Adult Education District administrators in the hope of identifying additional schools using group project activity.

Along with the second letter, an information form was sent to collect more specific data on the school or district in regard to group project activity (Appendix A). Of the 33 letters sent out 21 responses were received. Of these 21 responses received 15 indicated that they were involved in, or had recently been involved in, group project activities and would be consentable to a period of testing and/or observation.

The group project activity form asked if the school did have a group project activity underway as defined in the cover letter. If their response was affirmative they were directed to fill out the remainder of the form, giving specifics on the actual activity, teacher(s) involved, class size, history, and whether or not they would consent participation in the study.

Once the responses were collected a cataloging and analyzing procedure was used to determine which schools were to be visited and which schools were to be surveyed through the mail.

The schools to be visited were narrowed down to four, three in Wisconsin and one in Minnesota. A cover letter and information check list were then sent to those four schools (Appendix D). The information check list asked for additional, more specific information on the particular class's group project activity so that an evaluation instrument could be constructed.

Having received more specific information on these schools, identified as "schools visited," student questionnaires were constructed. (Appendix E).

These questionnaires were designed to meet the objectives as outlined in table 2. The questionnaires provided the student with an opportunity to respond to each statement twice. Once reflecting on his thoughts and feelings prior to the beginning of the class and again reflecting his feelings after having participated in the class.

Along with the student questionnaires, each instructor was asked to complete a task analysis questionnaire dealing with the management of group project activities (Appendix F).

Those schools that were not to be visited were sent a cover letter and two questionnaires to be filled out regarding group project activity. One of the questionnaires dealt with the skills needed by the instructor to manage a group project activity (Appendix F), the other dealt with the effectiveness of group project activity as perceived by the student participants (Appendix C). Table 2 gives the correlation between these instruments and objectives they were designed for.

One special interest group, the class in spinning wheel fabrication and operation which was in session for a two week period on the campus of the University of Wisconsin-Stout, was handled a bit differently. Because the class was readily available for observation and testing a comprehensive approach was taken by the researcher to gather as much first hand information as possible. A pre-test was given (Appendix B), based on the course objectives, at the beginning of the class. Personal observations and contact were made daily with the students and the teachers. A post-test was given at the end of the class session (Appendix B). The teachers involved were asked to fill out a task analysis questionnaire (Appendix F). All data gathered were run through weighted score analysis program

developed by the Center for Vocational, Technical and Adult Education at UW-Stout.

After all data were received and all visits made a letter expressing appreciation for the cooperation that was received was sent to all schools that had participated in the research effort (Appendix G).

CHAPTER 3

RESULTS

Introduction

All data gathered in this research effort were analyzed when possible by computer using a program of weighted score analysis previously developed by the Center for Vocational, Technical and Adult Education, UW-Stout. Total scores, mean scores, and standard deviations were the primary figures used to compare results and make conclusions on data gathered.

A detailed analysis of each group project's data, in relationship to the research objectives, follows. For convenience, data are analyzed in chronological order of procurement.

Spinning Wheel Group Project Activity

The class involved in making spinning wheels as a group project activity was made up of 20 students and two instructors. Facilities were located on the University of Wisconsin-Stout campus. The class had a scheduled meeting time of approximately six hours per day, however, working days of from 8-16 hours were observed. The class was in session for ten days over the Christmas Vacation and was offered by the university as part of their regular mini-session program.

To find out if the course objectives were going to be met a test was constructed (Appendix B) based on the course objectives previously determined by the instructors. This test was used for both pre- and post-testing.

The test was also designed to gather data on some of the objectives hypothesized in this study for group activity. Specifically data on the objectives dealing with palatability and on the objectives dealing with career information, performance beyond the course criterion level, and knowledge of group

interaction (Table 2) were collected.

Based on a weighted score analysis the highest possible score obtainable for the pre- and post-test was 165. The pre-test was administered on the first day of the session.

Figure 1 gives a visual comparison of the pre- and post-test total scores for the students who participated in the research effort. The mean score for the pre-test was 105 and the mean score for the post-test was 134. A t-test of differences was run on the scores to see if the learning that took place as shown by the differences in the pre- and post-test scores was significant. The t-test of difference value was 8.04 (Table 3) indicating that the difference between the pre- and post scores was statistically significant. (Critical value of t at .05 level = 2.160)

In reference to the pre- and post-tests (Appendix B) items 1 through 10 dealt with determining if the objectives of the course were met using group project activity. Table 3 shows the mean score and standard deviation of each test item for the pre- and post-test. The numerical score of 5 corresponds to "strongly agree" and the numerical score of 1 corresponds to "strongly disagree." Items 2,3, and 9 are negative, meaning that a low numerical indication would be a more positive response.

An analysis of mean pre- and post scores indicates that learning did take place with regard to the objective set down for the class. Scores indicate a significant gain in knowledge dealing with operation of a spinning wheel, (Item 1, 2.062 to 4.428) how thread is spun, (Item 4, 2.933 to 4.571) spinning wheel design (Item 6, 2.187 to 3.857) and wood properties and identification (Item 9 & 10, 2.500 to 1.428 and 2.812 to 3.857).

Items 11 through 15 dealt with knowledge above that required by the course objectives. Mean scores indicate a substantial gain (as average of 1.1 points) in knowledge not required by the course objectives. The most significant gain was in the understanding of jigs and fixtures (Item 14, 2.875 to 4.357).

TABLE 3
Pre- and Post-Test Item Comparisons
of Spinning Wheel Group

Test Item Number	Pre-Test		Post-Test	
	Mean	Stan. Dev.	Mean	Stan. Dev.
1. Explaining Wheel Operation	2.062	1.028	4.428	0.494
2. Understanding Wheel Operation (-)	2.375	0.856	2.000	0.755
3. Recognition (-)	3.000	1.172	2.642	1.230
4. Spinning of Thread	2.933	1.436	4.571	0.494
5. Materials Used	4.250	0.559	4.500	0.500
6. Designing and Building	2.187	1.285	3.857	0.832
7. Cultural Heritage	4.187	0.634	4.357	0.894
8. Sensitivity For Fabrics	3.875	1.268	4.142	0.832
9. Wheel Makeup (-)	2.500	1.224	1.428	0.494
10. Properties of Wood	2.812	1.333	3.857	0.832
11. Techniques Used in Construction	3.437	0.998	4.692	0.461
12. Factory Similarities	3.437	0.788	4.428	0.494
13. Components	3.375	0.856	4.615	0.624
14. Jigs and Fixtures	2.875	1.494	4.357	0.479
15. Exploring New Areas	2.687	1.102	3.428	1.347
16. Identification of Leaders	3.312	1.043	4.230	0.575
17. Understanding One's Role	4.187	0.526	4.428	0.494
18. Getting the Job Done	4.437	0.609	4.500	0.500
19. Delegation of Work	3.437	0.788	3.500	0.906
20. Time Assignments	3.250	0.559	3.571	1.049
21. Craftsmanship (-)	2.750	0.901	2.076	1.140

Table 3 continued

Test Item Number	Pre-Test		Post-Test	
	Mean	Stan. Dev.	Mean	Stan. Dev.
22. Palatability	3.687	0.845	4.428	0.622
23. All Classes and GPA's	3.312	0.681	3.000	0.925
24. Compromising	4.375	0.599	4.571	0.622
25. Instructor	2.937	1.087	4.414	0.557
26. Problem Solving	3.600	0.711	3.928	0.960
27. Personnel Structure	4.000	0.935	4.500	0.731
28. Palatability	4.062	0.899	4.571	0.622
29. Palatability	3.687	0.845	4.357	0.610
30. Palatability (-)	2.375	1.111	2.714	1.160
31. Parts Identification	1.250	0.559	3.285	1.097
32. Tool Identification	1.500	0.612	3.428	1.237
33. People Identification	1.062	0.242	3.785	0.772

FIGURE 1

Graphic Presentation of
Pre- and Post- Test Total Score
Comparisons for Spinning Wheel Group
(Appendix B)

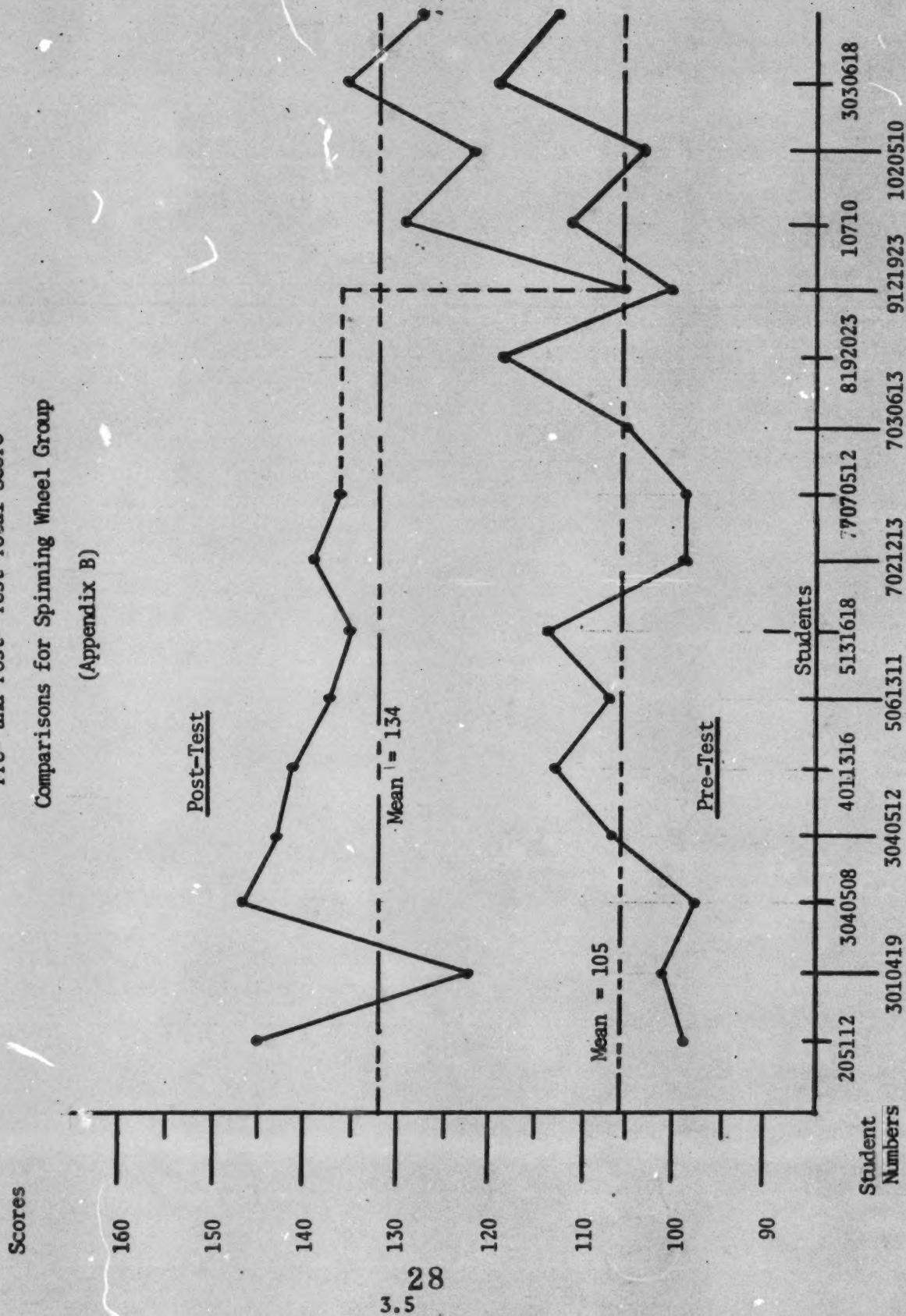


TABLE 4
Statistical Analysis of
t(difference) Spinning Wheel Group
Pre-Post-Tests

Scores Pre-Test	Scores Post-Test	Difference
99	143	44
101	122	21
98	146	48
106	143	37
102	142	40
114	136	22
99	135	36
99	140	41
105	138	33
111	129	18
103	116	13
119	135	16
113	122	9

Mean Pre-Test = 105.
Mean Post-Test 134.

Standard Deviation 6.8
Standard Deviation 9.4

t(difference) = 8.04

Item 16 through 30 dealt with palatability for the student, attitudes and knowledge of group project activity. Items 21 and 30 are weighted negatively. On the question of palatability of group activity for the student items 22, 25, 28, 29, and 30 are especially noteworthy. All of these responses showed an appreciable increase (an average of .78 points) indicating general enthusiasm and favor for the group project approach to teaching and learning. Participants were uncertain as to whether or not all classes should use group project activity (Item 23).

Items 31 through 33 in Table 3 correspond to the last three segments of the tests. The first segment (Item 31) asked students to list as many parts of a spinning wheel as he or she could. Post-test scores indicated a marked increase in performance in this task (from 1.250 to 3.285). The second section (Item 32) dealt with tool identification. Again a marked improvement was made when pre- and post-test scores were compared (1.500 to 3.428).

The last section (Item 33) dealt with group cohesiveness and interaction. Students were asked to name the other members of their group using nicknames, hopefully indicating a less formal, more congenial friendship that may be present. Pre-test indications were that the average participant only knew 3 of his fellow participants. At the conclusion of the 10 day class an average participant knew 15 of his 20 class participants.

Comments were solicited on both the pre- and post-tests as well as during personal, informal interviews conducted by the researcher. Generally, comments prior to the class were enthusiastic but a bit reserved, especially of those who had no prior hands-on experience in the area of woodworking. Comments at the conclusion of the class were positive and enthusiastic with a general feeling of accomplishment and pride in what had been done.

Observations by the researcher indicated that generally the participants were working very hard, continuously, and with a high degree of craftsmanship. Instructors were continually involved. Group cohesiveness was quick in forming and group interaction in problem solving was readily apparent.

Group Project Activities of Schools Visited

Of the four schools identified for personal visitation by the researcher three responded to the questionnaires that were administered.

Heartland Vocational Center

At the Heartland Vocational Center in Pine River, Minnesota, a class of 12 students under the direction of the Construction Careers instructor built a two-bedroom lake cottage as a group project activity. Students were involved with everything from laying the foundations to the finishing of the interior. Total length of the project was one school year.

Three visits were made by the researcher to the building site during the second half of the school year. During these visits observations were made regarding student involvement, commitment, and craftsmanship in the construction project (Appendix I). Within several weeks of the end of the school year questionnaires (Appendix E and F) were sent to the class and the instructor. The student questionnaires asked 25 questions dealing with the Heartland Vocational Center's specific group project activity in an attempt to measure several of the research objectives (Table 2).

Because of the time factor involved a pre- and post-test could not be administered. However, the questionnaire did provide for a pre- and post-response, the pre-response being made by the student reflecting on what he remembered his attitude to be at the beginning of the course. The student was then asked to respond to each question again based on how he felt at the conclusion of the class. Appendix E contains a sample questionnaire.

Mean scores and standard deviations for pre- and post-responses are given item by item in Table 5. Figure 2 is a graph depicting visually the pre- and post-responses. Items 7 and 22 are negative statements meaning that the lower mean score would indicate a more positive response. All other statements are weighted positively so a higher score is the more positive response. Numerically "Strongly Agree" corresponds with 5 and "Strongly Disagree" corresponds with 1.

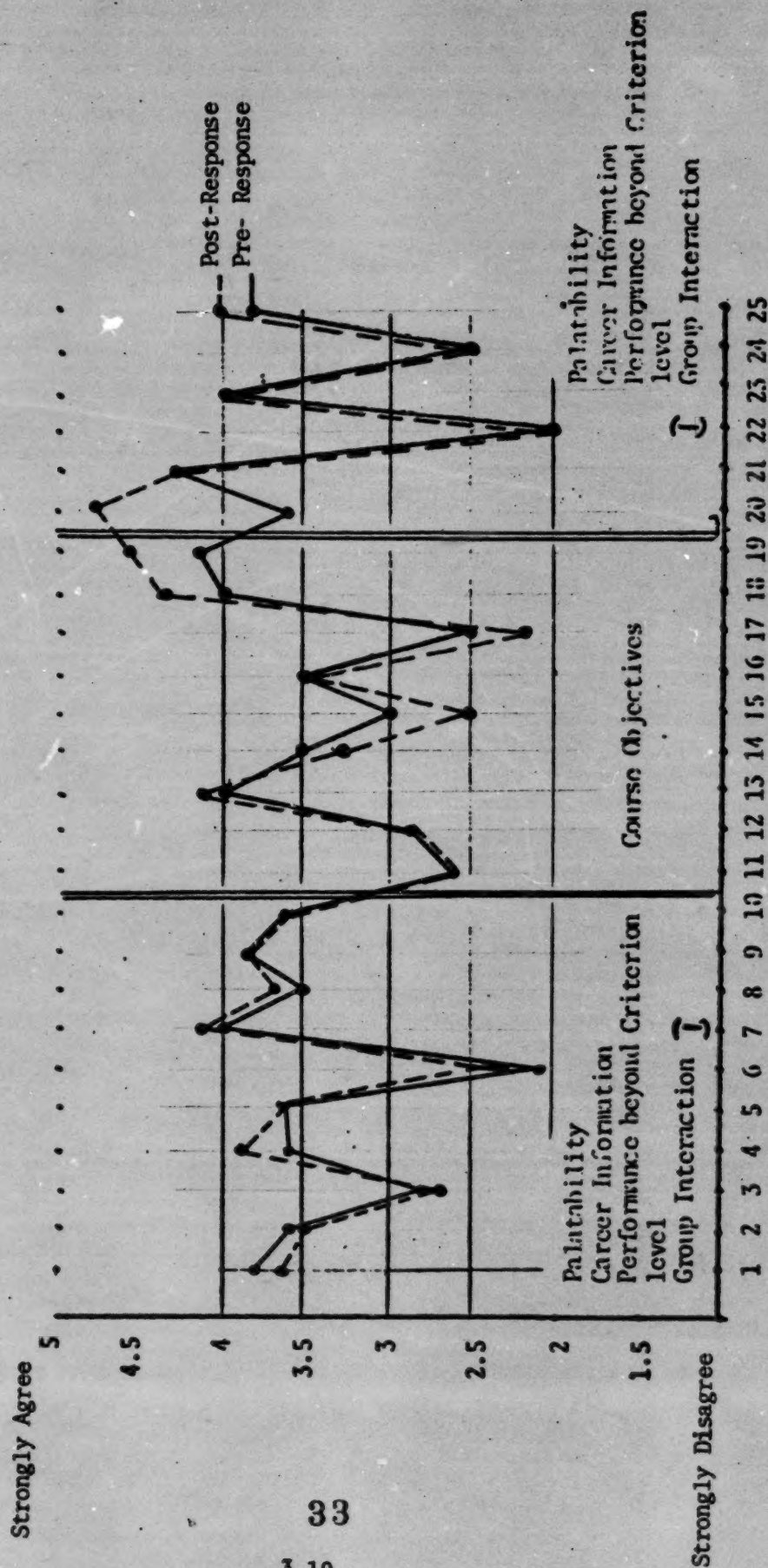
TABLE 5

Pre- and Post-Response Comparisons of
Heartland Vocational Center Student Questionnaire

Questionnaire Item	Beginning of Program		End of Program	
	Mean Score	Stan. Dev.	Mean Score	Stan. Dev.
1. Having fun in class	3.833	0.372	3.666	0.745
2. Learning subject matter	3.666	0.942	3.500	0.763
3. Real life situation	2.833	0.897	2.333	0.942
4. Teacher interest	3.600	0.800	3.833	0.687
5. I'm kept busy	3.666	0.942	3.666	0.942
6. Class discipline	2.166	1.067	2.333	1.247
7. Work by myself (-)	4.000	1.154	4.166	0.897
8. Learning from group	3.500	0.500	3.666	0.471
9. Future career	3.833	0.372	3.833	0.372
10. Learning	3.666	0.471	3.666	0.942
11. Duties of carpenter	2.666	0.942	2.666	0.745
12. Building own home	2.833	1.213	2.833	1.343
13. State building codes	4.000	0.577	4.166	0.687
14. Properties of wood	3.500	1.258	3.333	1.105
15. Real-life situation	3.000	1.290	2.500	1.607
16. Plumbing and electrical	3.500	0.763	3.500	0.763
17. Carpentry work	2.500	0.957	2.200	0.748
18. Wooden structures	4.000	0.577	4.333	0.471
19. Closing in	4.166	0.372	4.500	0.500
20. Working as part of a group	3.666	0.471	4.833	0.372
21. Getting job done	4.333	0.471	4.333	0.471
22. Craftsmanship (-)	2.000	1.000	2.000	1.414
23. Knowing my instructor	4.000	0.577	4.000	0.577
24. Work delegation	2.500	1.607	2.500	1.607
25. Good way to learn	3.833	0.687	4.000	0.577

FIGURE 2

Graphic Presentation of
Pre- and Post-Response Comparisons of
Heartland Vocational Center Student Questionnaire



Questionnaire Items
(Appendix E)

Statements 1 through 10 measure the research objectives of palatability for the student, career information, performances beyond the course objectives, and knowledge of group interaction.

Referring to Figure 2, there is no strongly apparent differences in total mean scores between the pre- and post-responses. Generally, the responses recorded are of relative high numerical value (positive reaction).

Post-responses for statements 1, 2 and 3, dealing with palatability, obtainment of course objectives, and career information, respectively showed a decrease in mean scores over the pre-responses (an average of .15 points). This would indicate that students' expectations for the class were not being met. Statement 4 (3.600 to 3.833), teacher interest, and statement 8 (3.500 to 3.666), learning from the group were the only two statements that showed a significant increase from pre- and to post-response. Statements 5, 7, 9 and 10 remained almost unchanged. Statement 6, dealing with class discipline, received a low pre-response (2.166) and a low post-response (2.333) indicating that the students felt that class discipline was not very good. Statements 11 through 19 had to do with the objectives of student achievement as determined by the course objectives. Statement 11, duties of a carpenter; 12, building one's own home; and 17, carpentry work; received low pre- and post-responses indicating that learning was not taking place. Learning did take place in the area of state building codes, statement 13 (4.000 to 4.166); wooden structures, statement 18 (4.000 to 4.333); and closing in, statement 19 (4.166 to 4.500). The remainder of the statements did not show any appreciable gain in learning.

Statement 20 through 25 measured palatability, attainment of course objectives, and career information - similar to the first 10 statements. Statement 20, group interaction, and 25, palatability, showed a positive increase from the pre- to the post-responses (3.666 to 4.833 and 3.833 to 4.000, respectively).

Statement 21, getting the job done; 22, a negative statement on craftsmanship; 23, knowing one's instructors; and 24, work delegation; remained unchanged

from the pre- to the post-responses. Statement 24 dealing with the statement regarding work delegation received a very low score both pre- and post (2.500) indicating that students felt that work was not being delegated among them fairly.

Researcher observations based on data gathered during personal visits (Appendix I) indicated that students were learning about carpentry more so than was shown by the questionnaire responses. Only six out of 12 class participants responded to the questionnaire which may explain these contradictions. There was observed a noticeable lack of group cohesiveness. Instructor apathy toward the accomplishments was also observed. There was also an expressed distaste for group activity by members over the fact that some participants were goofing off yet were not removed or banned from working on the project.

Bloomer High School

The Bloomer High School class in building construction built as a group project activity a large, multiple storage building (approximately 30' x 60') on the school grounds for the use by the school. The Senior class of building construction students (eight students) did most of the actual work. A Junior class in construction theory (15 students), on occasion, participate in some of the construction. Both classes were participants in the student questionnaire.

The questionnaire, consisting of 25 statements, dealt with group project activity in general and with the building construction project at Bloomer High School specifically. Statements 7 and 22 were weighted negatively, all others positively. There was a total of 19 respondents to the questionnaire. The questionnaire (Appendix E) was designed to meet the research objectives as outlined in Table 2.

The questionnaire, like the one administered to the Heartland Vocational Center students, provided for a pre- and post-response to each question corresponding to the beginning and the end of the class.

Table 6 gives the pre- and post-response comparisons using the mean scores and standard deviations for all 25 statements. Figure 3 gives a visual comparison of pre- and post-responses. Referring to Figure 3 post-response scores are shown to be generally more positive than pre-response scores. Statements 7 and 22 are negative so a lower score is the more positive response.

Statements 1 through 10 dealt with student palatability, career information, knowledge of group interaction and performance beyond the course criterion level.

Statements 1, having fun; 2, learning subject matter; 3, real-life situation; and 8, learning from the whole group showed the largest gain (an average of .52 points) from pre- to post-responses. Statements 4 (2.631 to 2.842), teacher interest; 6 (3.000 to 3.157), class discipline; and 10 (3.421 to 3.526), learning, showed only a slight increase from pre- to post-responses. Statements 5 (4.000 to 3.947), keeping busy; 7 (2.789 to 2.947), a negative statement about working by one's self; and 9 (3.210 to 3.105), future career information, showed a negative response trend from the pre- to the post-responses.

Although the students indicated they would have rather worked by themselves, they did agree that they were learning the subject matter, that it was fun, and that they were receiving career information.

Statements 11 through 19 support the indications that learning was taking place. All these statements were designed to measure whether or not the course objectives were being met. With the exception of statement 17 (3.000 to 2.947), carpentry as an outside job, all other statements showed an increase from the pre- to post-response scores (an average of .74 points). The most noticeable increase in learning was indicated by statements 11 (3.157 to 3.521), duties of a carpenter; 12 (2.684 to 3.105), designing and building; 14 (3.473 to 3.736), properties of wood; and 15 (3.235 to 3.823), real-life situation. These scores show that this group project activity provided for learning by the students.

Statements 20 through 25 dealt with measuring palatability, career information, performance beyond the criterion level and a knowledge of group inter-

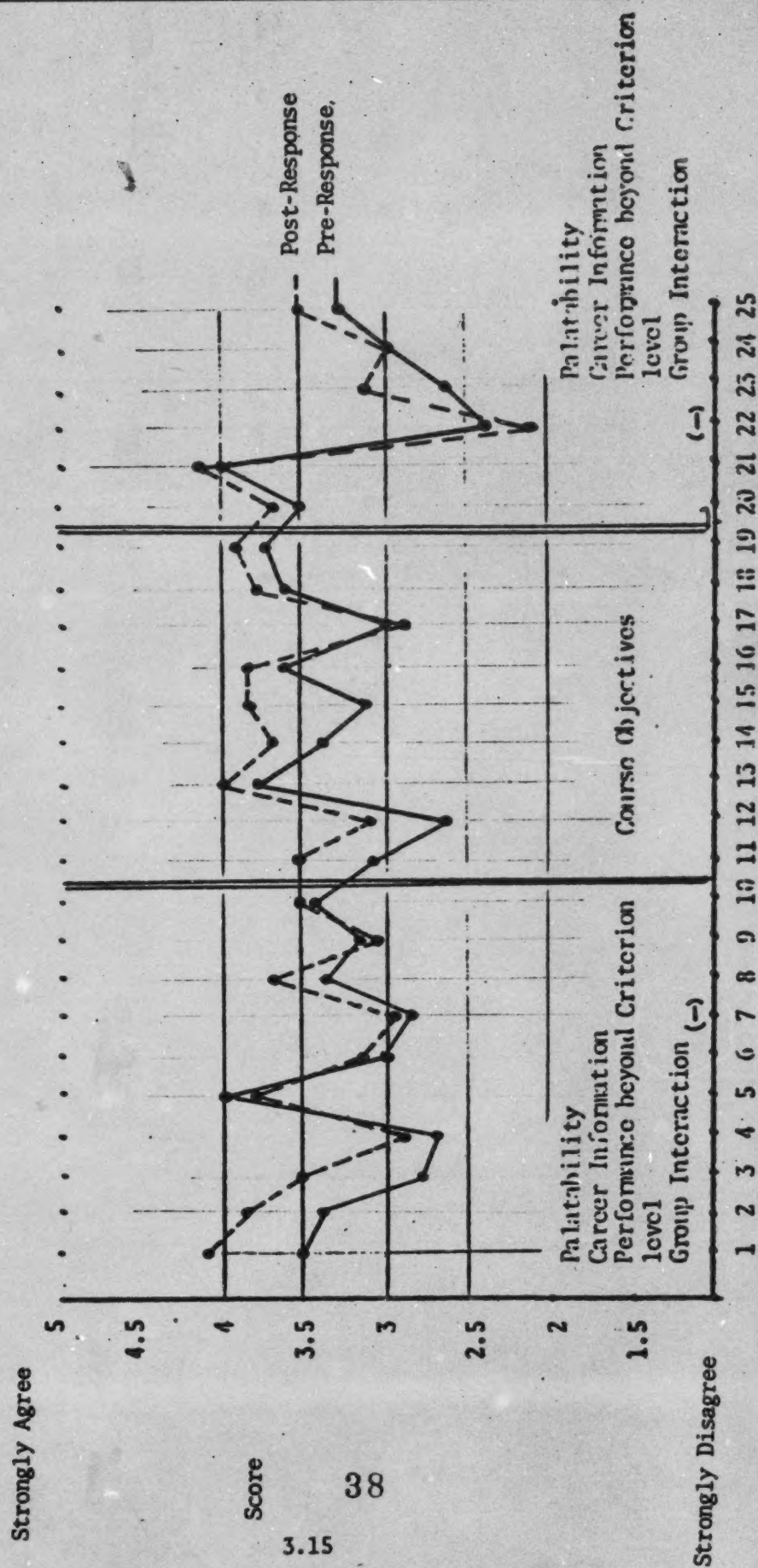
TABLE 6

Pre- and Post-Response Comparisons of
Bloomer High School Student Questionnaire

Questionnaire Item	Beginning of Program		End of Program	
	Mean Score	Stan. Dev.	Mean Score	Stan. Dev.
1. Having fun	3.526	1.186	4.105	0.640
2. Learning subject	3.421	0.935	3.894	0.787
3. Real-life situation	2.789	1.321	3.578	1.183
4. Teacher interest	2.631	0.808	2.842	0.987
5. Kept busy	4.000	0.917	3.947	1.049
6. Class discipline	3.000	1.025	3.157	1.088
7. Work by myself (-)	2.789	0.950	2.947	1.145
8. Learn by group	3.473	0.938	3.736	0.908
9. Future career	3.210	1.004	3.105	1.118
10. Learning	3.421	1.091	3.526	1.186
11. Duties of a carpenter	3.157	1.039	3.526	0.880
12. Designing and building	2.684	1.258	3.105	1.333
13. Building codes	3.789	0.950	4.052	0.944
14. Properties of wood	3.473	0.938	3.736	0.848
15. Real-life situation	3.235	1.058	3.823	0.922
16. Plumbing and Electrical	3.631	0.929	3.842	0.669
17. Outside job	3.000	1.169	2.947	1.234
18. Construction details	3.631	0.740	3.894	0.717
19. Closing-in	3.789	1.055	3.947	1.145
20. Working as part of a group	3.578	0.815	3.684	1.028
21. Get my part done	4.052	0.825	4.157	0.586
22. Craftsmanship (-)	2.473	1.352	2.210	1.435
23. Knowing instructor	2.684	0.976	3.210	0.950
24. Work delegation	3.052	1.234	3.052	1.356
25. Good way to learn	3.368	1.086	3.578	1.042

FIGURE 3

Graphic Presentation of
Pre- and Post-Response Comparisons of
Bloomer High School Student Questionnaire



action. With the exception of item 24, work delegation, which remained unchanged, all statements in this section showed an increase in post-responses over pre-responses (an average of .30 points).

Due to a layout mistake by the researcher in the section of the questionnaire dealing with comments, student response to that section was unavailable or indicated a misunderstanding. The comments section should have read "..... storage building" instead of "....mobile home" (Appendix E).

Data indicates that the group project activity at Bloomer High School was a success. It did provide for a palatable learning experiences, and did give the student career information and an awareness of group interaction. The project was well planned and student participation and interaction seemed to be functioning productively. Based on personal observations students appeared to be collectively enthusiastic and proud of these achievements and generally positive toward their experiences with the group project activity.

Oshkosh High School

At Oshkosh West High School a group of 14 students was involved in the construction of a functional, flyable, two-place aircraft as a group project activity. The project was in its second year with many of the students having participated both years.

The questionnaire (Appendix E) sent to the students consisted of 25 questions and was designed to measure certain objectives as outlined in Table 2. There were 14 students who responded to the questionnaire. The questionnaire provided for a pre- and post-response to each statement. Table 7 gives all the pre- and post-response mean scores and their respective standard deviations. Figure 4 provides a more visual reference to the pre- and post-responses for the questionnaire.

Statements 7, 15, 16, and 22 were to be weighted negatively meaning that a response approaching the lower end of the scale is the more positive.

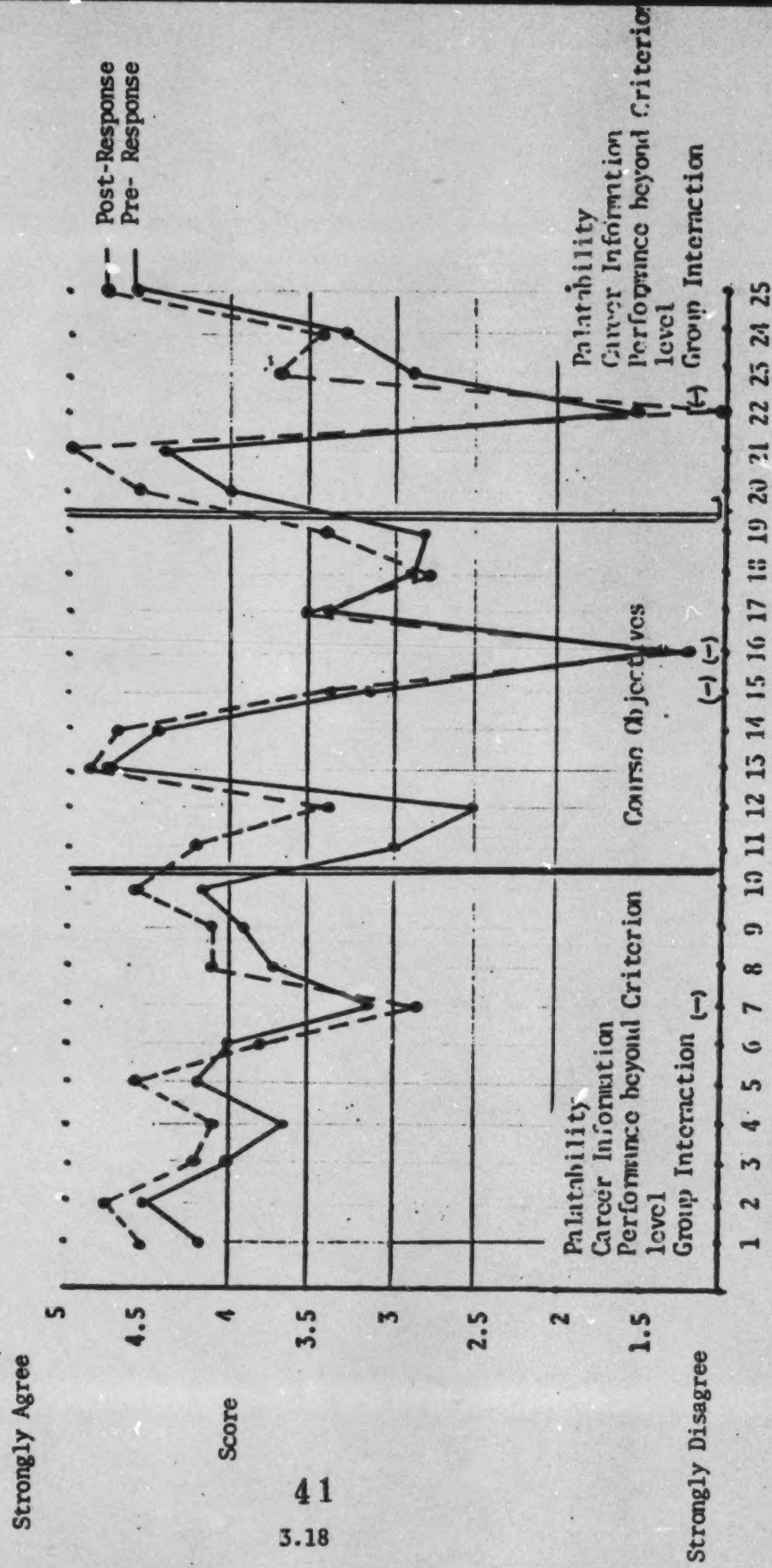
TABLE 7

Pre- and Post-Response Comparisons of
Oshkosh West High School Student Questionnaire

Questionnaire Item	Beginning of Program		End of Program	
	Mean Score	Stan. Dev.	Mean Score	Stan. Dev.
1. Palatability	4.214	0.557	4.500	0.500
2. Learning subject	4.500	0.626	4.714	0.451
3. Real world work	4.000	0.925	4.214	0.673
4. Teacher shows interest	3.642	0.811	4.142	0.832
5. I'm kept busy	4.214	0.673	4.500	0.500
6. Class discipline	4.000	0.755	3.714	0.589
7. Rather work by myself (-)	3.214	1.263	2.857	1.456
8. Learn from whole group	3.785	0.772	4.214	0.673
9. Future career	3.928	0.798	4.214	0.860
10. Learning more	4.285	0.699	4.571	0.494
11. Duties of aircraft worker	3.000	1.069	4.357	0.479
12. Design and build	2.571	1.293	3.428	0.903
13. Quality work	4.857	0.349	4.928	0.257
14. Jigs and Fixtures	4.428	0.903	4.785	0.772
15. Fabrics add strength (-)	3.153	0.863	3.384	1.273
16. FAA need not be consulted (-)	1.428	0.622	1.285	0.795
17. Career information	3.428	0.622	3.571	0.820
18. Carbonizing flame	2.900	0.830	2.800	0.748
19. Properties of 4130 steel	2.818	0.935	3.400	0.800
20. Working as part of a group	4.071	0.703	4.500	0.500
21. Getting my part done	4.357	0.894	5.000	0.000
22. Craftsmanship (-)	1.642	1.171	1.000	0.000
23. I know instructor	2.928	0.883	3.714	0.880
24. Work is delegated	3.357	0.971	3.428	1.178
25. Good way to learn	4.571	1.049	4.714	1.030

FIGURE 4

Graphic Presentation of
Pre- and Post-Response Comparisons of
Oshkosh West High School Student Questionnaire



Questionnaire Items
(Appendix E)

Statements 1 through 10 measure student palatability, reception of career information, performance beyond the course criterion level and knowledge of group interaction. All statements showed a gain (an average of .37 points) from an already relatively high pre-response, indicating that they were learning, that it was fun, and that they were receiving information on group interaction. Statements 1, palatability; 2, learning subject; 4, teacher interest; 8, learning from the whole group and 10, learning more, showed the highest gain (average of .4 points).

Statements 11 through 19 dealt with the measurement of knowledge gained as determined by the course objectives for this group project activity. With the exception of statement 18, carbonizing flame, all statements showed a positive increase in scores. Statements 11 (3.000 to 4.357), duties of an aircraft worker; 12 (2.571 to 3.428), designing and building; and 19 (2.818 to 3.400), properties of 4130 steel all showed the highest gains from pre- to post-responses. Data indicated that learning was taking place and that the course objectives were being met.

Statements 20 through 25 measured the same things as statements 1 through 10. All of these statements showed a positive advancement from the pre- to the post-responses, including statement 22 which was weighed negatively. Statements 20 (4.071 to 4.500), concerned with working as a group; 21 (4.357 to 5.000), related to craftsmanship; and 23 (2.928 to 3.714), dealing with knowing the instructor, all showed an increase from the pre- to the post-response mean scores. Statements 24 and 25, although showing an increase, were not as substantial (3.357 to 3.428 and 4.571 to 4.714, respectively). Statement 25 with a high pre-response and even higher post-response indicates that students had positive feelings that this group project activity was a good way to learn.

Observations (Appendix I) made by the researcher support the questionnaire responses and student comments. The group seemed to function well, work was accomplished and craftsmanship remained high. Problems were solved collectively and efficiently. The group project was well organized and appeared to provide worthwhile educational experiences for the project participants.

Mid-State Technical Institute, Marshfield

The Wood Technics class at Mid-State Technical Institute, Marshfield participated in part of this study but did not respond to the questionnaires. However, observations were made by the researcher on several visits to the class. Their group project activity was the building of a camper trailer of approximately 30 feet in length. This activity was done the last half of the school year of the one-year program.

Data collected from personal interviews and observations (Appendix I) indicate that this group project activity was providing the student with valuable learning and group interaction experiences directly pertaining to his possible future career.

Group Project Activities of Schools Not Visited

There were ten classes that were not visited, but were identified as having group project activities, that responded to a student questionnaire (Appendix C). A total of 243 students responded to this questionnaire. The ten question questionnaire dealt with several of the study's major objectives; student palatability, acquisition of career information, performance beyond the course criterion level, and knowledge of group interaction (Table 2).

The students were asked to subjectively evaluate the statements on the questionnaire with respect to experiences in their group project activity. A response of 5 corresponds to "Strongly Agree" and 1 corresponds to "Strongly Disagree." Statement 7 was weighted negatively, the rest positively.

Table 8 gives the mean scores and standard deviations for responses to each of the statements by school. The average of the scores are also presented in this table as well as in Figure 5 where the averages are graphically portrayed.

TABLE 8

Analysis of Questionnaires Mailed to
Schools Not Visited

School 00 Students = 7

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	4.571	4.428	4.000	2.857	4.714	4.285	3.000	4.285	4.000	4.142
Stan. Dev.	0.494	0.494	0.925	0.832	0.451	0.451	0.535	0.699	0.755	0.832

School 01 Students = 24

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	3.541	3.916	2.791	3.125	3.791	3.458	2.416	3.666	3.250	3.916
Stan. Dev.	0.865	0.862	1.290	1.053	0.999	0.705	1.288	0.799	1.198	1.076

School 02 Students = 20

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	4.294	4.352	4.470	3.705	4.235	4.176	2.588	4.352	4.294	4.176
Stan. Dev.	0.455	0.477	0.499	0.823	0.545	0.381	0.844	0.762	0.665	0.705

School 03 Students = 10

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	3.900	3.900	4.000	3.800	4.100	3.900	2.799	4.700	4.200	3.800
Stan. Dev.	0.300	0.300	0.000	0.400	0.538	0.538	0.979	0.458	0.400	0.599

School 04 Students = 43

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	3.651	3.880	3.000	2.511	3.837	3.604	2.238	3.697	3.690	3.279
Stan. Dev.	0.937	0.661	1.056	0.817	0.744	0.810	1.042	0.763	0.938	0.948

TABLE 8 continued

School 05 Students = 25

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	3.440	3.600	3.200	3.280	4.320	3.920	3.119	3.880	3.040	3.440
Stan. Dev.	0.941	0.748	0.978	0.875	0.835	0.890	1.177	1.032	0.999	0.983

School 06 Students = 19

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	3.684	3.777	3.263	2.789	3.473	3.368	2.157	3.842	3.842	3.473
Stan. Dev.	1.078	0.628	0.848	1.004	1.093	1.086	1.225	0.874	0.744	0.938

School 07 Students = 17

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	3.705	3.941	2.941	2.705	4.058	3.705	2.562	3.823	3.823	3.529
Stan. Dev.	0.570	0.539	1.161	0.892	0.638	1.071	1.321	0.922	0.705	0.977

School 08 Students = 17

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	4.117	4.058	3.588	3.294	3.411	3.705	2.647	3.588	3.941	4.235
Stan. Dev.	0.675	0.539	0.844	0.892	0.911	0.892	0.836	0.911	0.725	0.806

School 09 Students = 61

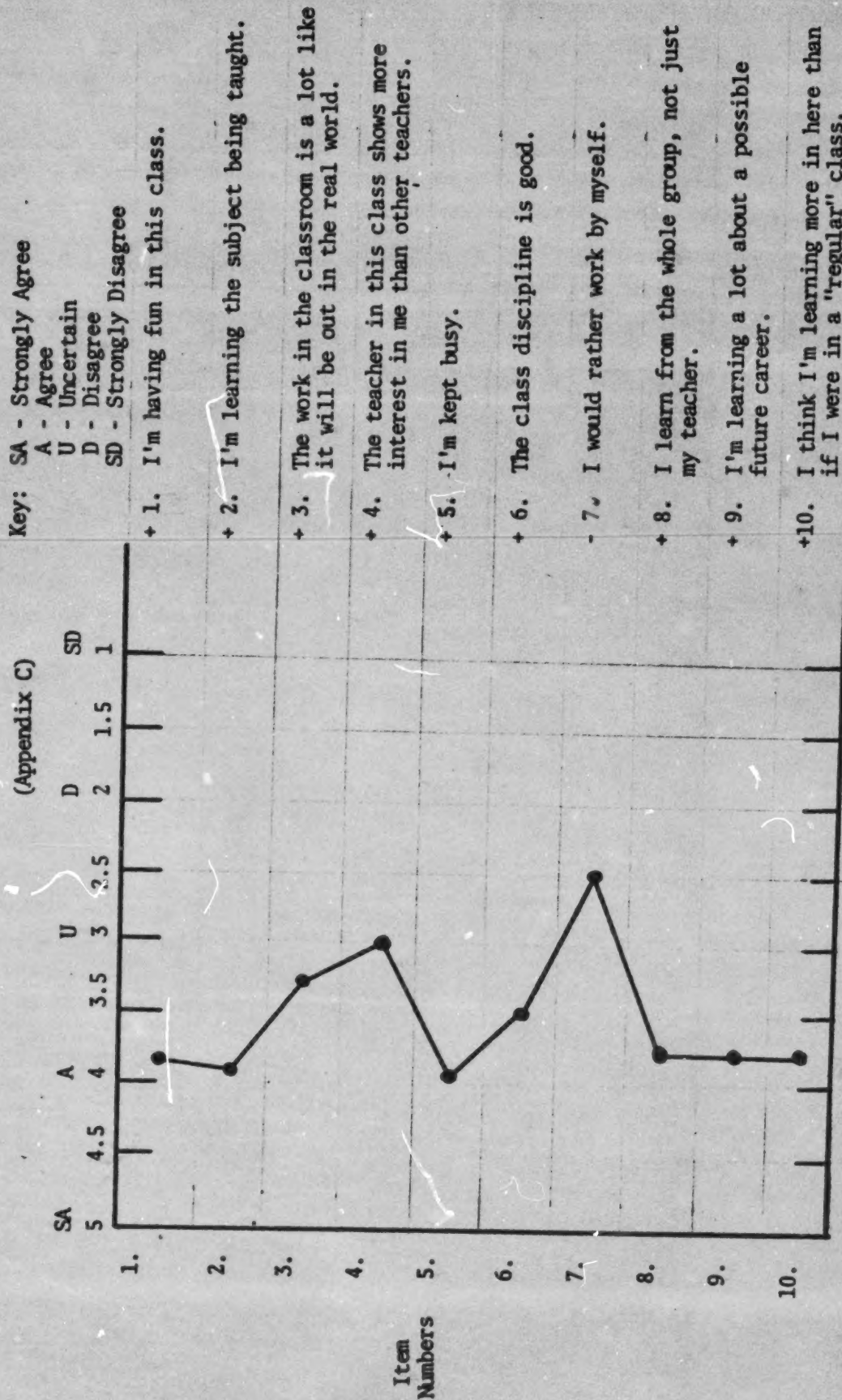
Items	1	2	3	4	5	6	7	8	9	10
Mean Score	4.116	4.033	3.327	3.316	3.866	3.100	2.549	3.433	3.770	4.133
Stan. Dev.	0.797	0.882	1.019	1.244	1.056	1.106	1.101	1.116	1.206	1.161

School Totals Students = 243

Items	1	2	3	4	5	6	7	8	9	10
Mean Score	3.857	3.953	3.316	3.096	3.912	3.564	2.544	3.748	3.711	3.786
Stan. Dev.	0.865	0.737	1.079	1.052	0.926	0.969	1.130	0.957	1.029	1.051

FIGURE 5

Total Student Questionnaire Response
Comparison for Schools Not Visited



Referring to Figure 5 it can be seen that statements 1 (3.857), palatability; 2 (3.953), learning the subject; and 5 (3.912), keeping busy, received the highest mean scores. Statement 1 had a range of scores from 4.571 to 3.440. Statement 2 ranged from a high of 4.352 to a low of 3.600. Statement 5 ranged from 4.714 to 3.411.

Statements 8 (3.748), learning from the whole group; 9 (3.711), learning about a future career; and 10 (3.786), learning more here than in a regular class, all received moderately high mean scores. Statements 3 (3.316) and 6 (3.564) dealing with the real-world like work and class discipline respectively, received somewhat lower mean scores. Statement 4, teacher interest; had an average score of 3.096 a value very near that termed uncertain (3.000). Statement 7 (2.544), a negative statement on working by one's self, received a low score indicating that students surveyed would rather work as part of a group.

With the exception of statement 4 (The teacher in this class shows more interest in me than other teachers.), the majority of the students indicated a positive response to the questionnaire statements, indicating agreement that group project activities were a palatable way to learn, and that they provide for knowledge in the area of future careers and group interaction.

Instructor Responses on Management of Group Project Activities

All instructors of group activities surveyed in this report were asked to complete a group project activity task analysis questionnaire (Appendix F). Of the approximately 23 instructors polled, 17 responded to the questionnaire.

The questionnaire listed 12 management tasks (previously identified by the researcher) that required a response of from "Very Important" to "Not

Needed." Space was also provided at the end of the questionnaire for additional tasks or comments dealing with managing a group project activity successfully. Figure 6 gives a visual indication of the average respondents' feelings on the 12 tasks identified in the questionnaire.

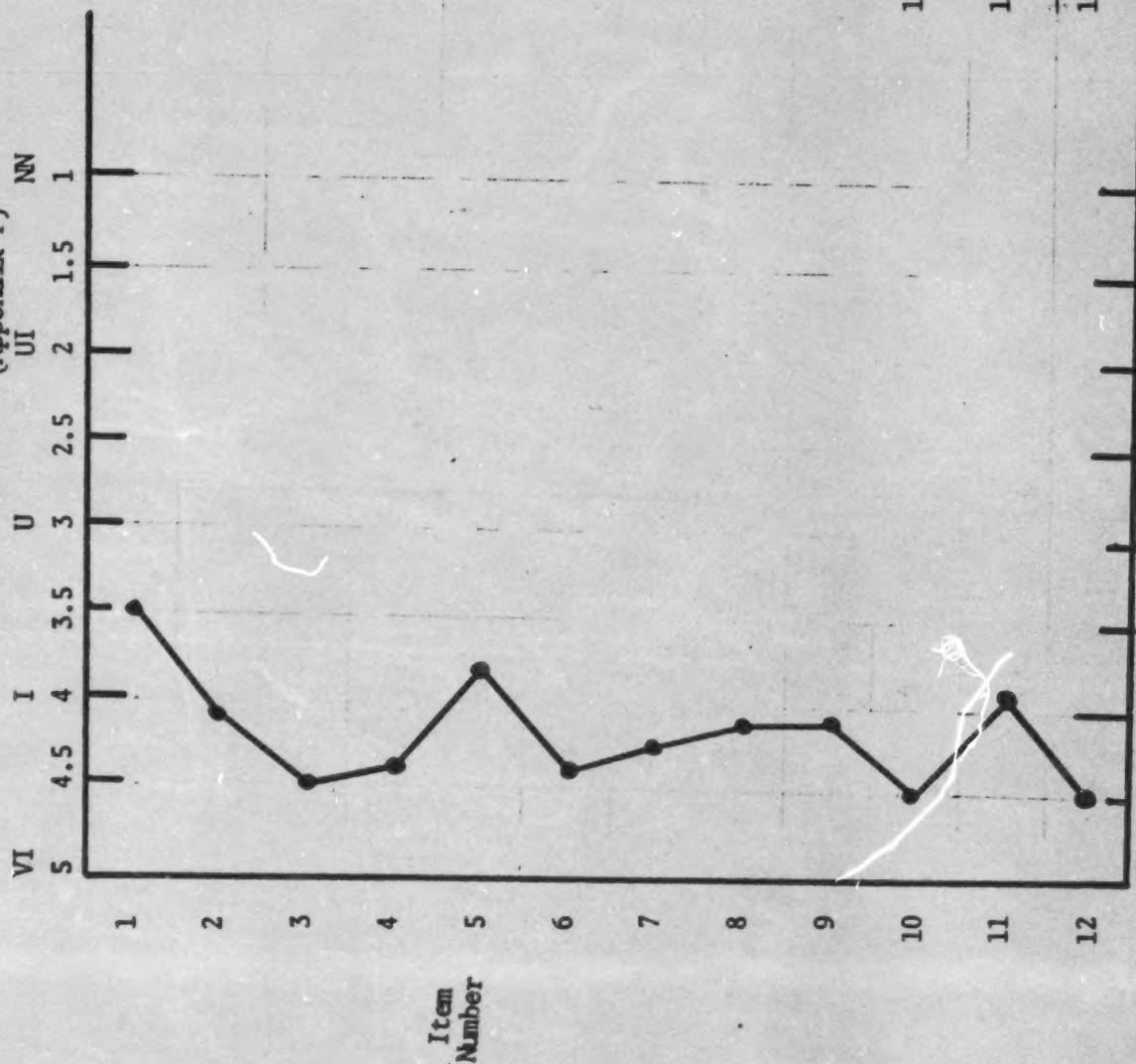
Of the 12 management skills identified all received relative high mean scores. Skill in subject matter (task 3), ability to organize students, (task 4), a lot of patience (task 6), and the ability to teach and learn in an informal activity (task 12), had the highest mean scores. The ability to write behavioral objectives (task 1), public speaking ability (task 5), and above average teaching skills (task 11) received the lowest mean scores. Of the tasks listed, none were identified as unimportant, or not needed.

Respect for student opinion and choices, confidence in school administration, and a positive attitude toward the end product were some of the additional tasks identified by the teachers who responded to the study.

Of the management skills rated or identified none appear, in the researcher's opinion, to be especially unusual or unique to group project activity.

FIGURE 6
Instructor Response to
Group Project Activity Management
Task Analysis Questionnaire
Total Mean Responses
(Appendix F)

Key: VI - Very Important
I - Important
U - Uncertain
UI - Unimportant
NN - Not Needed



1. Ability to write behavioral or performance objectives.
2. Previous teaching experience.
3. Skill in subject matter of the group project activity.
4. Ability to organize students.
5. Public speaking ability.
6. A lot of patience.
7. A thorough understanding of group project activity.
8. Ability to develop or modify curriculum.
9. The desire to work as part of a team.
10. Ability to teach and learn in an informal atmosphere.
11. Above average teaching skills.
12. A complete commitment to the activity.

Item
Number

Discussion

The purpose of vocational education is to provide skills and knowledge that will allow the student participant to become employable. In the course of this research effort the researcher found that group project activity works very well in fulfilling the objective of vocational education.

Group project activities seem to work, that is, they accomplish the task of presenting information to the student so that it is digestible, understandable, and useful. But there is more. Something happens in a group project activity that makes the whole teaching-learning situation unique in providing more than just a basic education for the student.

What happens is still hard to define. But it seems that the real-life situation presented is a major point. The world of work is people working together to get something done. Group project activity is the same, a group of people working together to accomplish a single objective. This working together requires interaction, compromise, understanding, leadership, and problem solving; all those things that are part of the real world.

Working on a group project activity provides for the participation in actual experiences that will be found in the chosen future career. In this sense group project activity provides for the participant knowledge of future careers.

Group Project Activity provides for performance beyond the course criterion level. Participants achieve skills in performance above, and knowledge beyond those required in the course objectives. Skill in, and knowledge of problem solving, leadership, organization, management, and research are present to various degrees in group project activities.

For the student who would rather work alone provisions can be made within the group setting to allow for individual responsibilities and achievements. Individual craftsmanship and skill can and should be recognized within the group.

The vocationally educated student can come away from a group project activity with more than a saleable skill. The knowledge and experiences gained in social interaction will help him become a productive, efficient, and socially compatible member of the work group. This is what makes group project activity unique.

Generally, it can be concluded that group project activities do work and that they can be handled by the average vocational instructor who is willing to commit himself to the project and his students.

Conclusions

Based on the data gathered within this report, and analyzed according to the methods outlined, several conclusions can be made as to the effectiveness of group project activities in vocational education. Each population group and conclusions made from related data will be presented first, followed by general conclusions based on interrelated data analysis.

Spinning Wheel Group

Attainment of learning in accordance with the course objectives as measured by the spinning wheel pre- and post-test (Appendix B) show that learning did take place. Statements 1 through 10, 31, and 32 dealt with the course objectives. The average gain in score value in this area was 31 percent from the pre- to the post-test. It can be concluded therefore that learning did take place in the group activity relative to the course objectives. (Hypothesis 1).

Palatability was measured by pre- and post-test statements 16 through 30, and 33. Post-test scores reflected a 17 percent gain over pre-test scores with an average post-test score of 3.9 (5 point scale). It can be concluded then, that 50 percent or more of the students agreed that the group project activity was a palatable learning experience. (Hypothesis 2).

Knowledge of group interaction, achievement beyond the course criterion level, and obtainment of career information was measured by test statements 11 through 15. Post-test scores showed an average increase in scores of 37 percent over pre-test scores, indicating that 50 percent or

more of the students were gaining a knowledge of group interaction, achieving beyond the course criterion level, and were obtaining career information. (Hypothesis 3).

Schools Visited

Data collected from the questionnaires (Appendix E) administered to the three schools visited is used to support several conclusions on three of the report's major objectives (Table 2).

Data indicate that learning took place in only two of the three schools tested. Heartland Vocational Center showed an average drop in learning of 1 percent whereas the Bloomer High School project showed an increase in learning of 12 percent and Oshkosh West High School showed an increase of 11 percent. It can be concluded that in the majority of schools tested, learning did take place. (Hypothesis 1).

With regard to palatability as measured by the questionnaires, statements 1, 4, 6, 7, 24, and 25 (designed to measure palatability) indicated that there was a gain in the feeling of palatability of 3 percent for the Heartland Vocational Center, 4 percent for Bloomer High School, and 2 percent for Oshkosh West High School. It can be concluded that palatability was not significant but did show a gain after completion of the course. (Hypothesis 2).

Knowledge of group interaction, achievement beyond the course criterion level, and obtainment of career information was measured by statements 2, 3, 5, 8, 9, 10, 20, 21, 22, and 23. Data analysis indicated a 2 percent average rise in this area for the Heartland Vocational Center, a 6 percent rise for Bloomer High School and a 9 percent rise for Oshkosh

West High School. It can be concluded that knowledge of group interaction, achievement beyond the course criterion level and career information were being obtained. (Hypothesis 3).

Schools Surveyed by Mail (Schools Not Visited)

The questionnaire sent to the schools not visited was designed to gather data on two major objectives of the study as outlined in Table 2. Statements 1, 4, 5, 6, and 7 of the questionnaire (Appendix C) were designed to measure palatability. The average score for these statements for all of the 243 respondents was 3.39 (Scale of 5). It can be concluded from this average that the 50 percent or more of the respondents felt uncertain (but tended to lean toward agreement) that group project activities were palatable. (Hypothesis 2).

Statements 2, 3, 8, 9, and 10 dealt with measuring attainment of career information, performance beyond the course criterion level, and knowledge of group interaction. The average score for these statements was 3.70 (Scale of 5). It can be concluded from this average that 50 percent or more of the students agreed that they were meeting the previously stated objectives. (Hypothesis 3).

Instructor Responses

Seventeen out of twenty-three instructors (74%) responded to the management task questionnaire (Appendix F). Fifty percent or more of those responding indicated a score of 3.5 (Scale of 5) or better on all of the skills listed. It can be concluded then, that all these skills, as listed on the instrument, were felt by the majority of the respondents to be those

skills needed to successfully manage a group project activity. These skills, originally identified by the researcher as skills needed in teaching many vocational subjects, have also been agreed upon by the majority of the respondents to be those skills needed to successfully manage a group project activity. (Hypothesis 4).

General Conclusions

1. On attainment of course objectives: It can be concluded that in the majority of cases presented learning did take place in the group project activity setting.
2. On palatability: It can be concluded that with regard to data collected and analyzed group project activities are not significantly palatable to the student. However, it can be concluded that they are not, in the majority of the cases, an un-palatable experience. Interjecting a subjective observation by the researcher on the question of palatability it could be concluded that group project activities provide for a palatable process to learning for the students.
3. On knowledge of group interaction, achievement beyond the course criterion level, and attainment of career information: In the majority of the cases encompassed it can be concluded that there was a measured increase.
4. On skills required by the instructor: It can be concluded that no skills were identified as being unique to the successful management of a group project activity.

Recommendations

This study was concerned with appraising the effectiveness of group project activities in vocational subjects. What needs to be done now is to gather data supporting the hypothesis that group project activity can provide a very meaningful, and essential means of giving the vocational student those skills needed to be a productive, responsible, happy member of the work group.

Data need to be gathered on the comparison of group project activities to the more traditional approaches to learning and teaching. The idea of using group project activities more extensively needs to be brought to the attention of educators and administrators.

What about non-vocational subjects? Can group project activities be of use in these situations? Data need to be gathered on these questions.

More data need to be gathered on how the student learns within the group. Not only how he learns vocational skills but how he learns social skills.

Follow-up studies need to be done on participants in the work force to determine their success and failures and how they might relate to their training through the use of group project activity.

The existence of group project activity is not new but its recognition as an effective educational process has always been met with mild curiosity, skepticism, or apathy. Group project activity needs to be made presentable and recognizable as a very useful, valid, and effective method of teaching and learning.

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Personal References

Heintz, Dr. Kenneth G., Associate Professor, University of Wisconsin-Stout
Menomonie, Wisconsin

Johnson, Mr. Curtis, Teacher, Pine River High School, Pine River, Minnesota

Peterson, Mr., Teacher, Bloomer High School, Bloomer, Wisconsin

Scoville, Mr. S.C., Teacher, Oshkosh West High School, Oshkosh, Wisconsin

Stallsmith, Mr. Douglas D., Assistant Professor, University of Wisconsin-Stout
Menomonie, Wisconsin

Thomas, Dr. Henry L., Professor, University of Wisconsin-Stout,
Menomonie, Wisconsin

Van Handel, Mr. Larry, Instructor, Mid-State Technical Institute,
Marshfield, Wisconsin

Appendix A

Date

Name
Title
Address
City, State, Zip

Dear name:

A proposal to study group project learning is presently being investigated for the Center for Vocational, Technical and Adult Education here on the campus of the University of Wisconsin-Stout.

The purpose of this research is to appraise group project learning within the vocationally oriented classroom. A need to identify existing classrooms that have used this approach or that are using it at present is a first step in this research.

Examples of classes that might use group project learning are; building construction or carpentry classes and their group effort to construct a house or farm building; or, a class in mechanics building an airplane or a group project.

Perhaps you are aware of such examples of group project learning within your own state. If so I would appreciate hearing from you and finding out where this type of learning exists or has been tried.

Sincerely yours,

Keith R. Myers
Graduate Assistant
University of Wisconsin-Stout

mjc

Group Project Activity Questionnaire

School _____ Telephone _____

Address _____ Zip Code _____

Instructor _____

_____ YES, Group Project Activities are being done in our school.

_____ NO, Group Project Activities are not being done in our school.
(No need to complete this form, but do return in business reply
envelope provided. Thank you.)

***Please fill out one form for each class or group involved.

1. Name of class or group involved in group project activity: _____

2. Number of students participating: Total _____ Male _____ Female _____

3. Name of teacher(s) involved: _____

Department: _____

4. Please give a brief description of what the group project activity is:

5. Is group project activity a major part of this class or group?

Yes _____ No _____

6. Is this the first time this class or group has been involved in group
project activity?

Yes _____ No _____

7. Will this class or group be continued second semester using group project
activity?

Yes _____ No _____

8. Has the teacher been involved in group project activity before?

Yes _____ No _____

9. Would this class be consentable to observation and/or testing for one
hour at the beginning and one hour at the end of the second half of
this school year?

Yes _____ No _____

January 17, 1974

name
title
address
city, state zip

Dear name:

Here at the Center for Vocational, Technical and Adult Education, work has been initiated on the study of group project activity. We are defining this as an activity in which a group of students participate to accomplish learning. Building a house, an airplane, or producing a product or service by a group of students would be examples of group project activities.

An attempt is now being made to identify schools that are using the group project activity method. Enclosed is a form asking information on the particular group project activity in which your school may be involved. Based on the cooperation received, further study will be done. Those willing to participate will be sent a summary report. It would be most appreciated if this form were completed and returned in the business reply envelope provided.

Sincerely yours,

Keith R. Myers
Graduate Research Assistant
Center for Vocational, Technical
and Adult Education

KRM:po

Enclosure

Appendix B

1. If asked, I could easily explain how a spinning wheel operates.
2. The principles of the operation of a spinning wheel are complicated.
3. Spinning wheels are pretty much the same in appearance the world over.
4. I understand the spinning of thread.
5. I know where spinning materials (for making thread, yarn, etc.) come from.
6. I could design and build my own spinning wheel.
7. I understand and appreciate the significance of the spinning wheel in our cultural heritage.
8. I feel a sensitivity for fabrics, fabric design and quality.
9. The spinning wheel in this class is made from a variety of woods.
10. I am familiar with the properties of wood.
11. The production line technique is a part of this class.
12. This class could be called a miniature replica of a spinning wheel factory.
13. This spinning wheel has over 30 individual parts that have to be made and assembled.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree

List as many tools and machines as possible that are involved in making a spinning wheel.

a) _____	k) _____
b) _____	l) _____
c) _____	m) _____
d) _____	n) _____
e) _____	o) _____
f) _____	p) _____
g) _____	q) _____
h) _____	r) _____
i) _____	s) _____
j) _____	t) _____

Name as many people as you can (use first names or nicknames only) that are a part of this group. Check (✓) those people you think you know pretty well.

a) _____	l) _____
b) _____	m) _____
c) _____	n) _____
d) _____	o) _____
e) _____	p) _____
f) _____	q) _____
g) _____	r) _____
h) _____	s) _____
i) _____	t) _____
j) _____	u) _____
k) _____	v) _____

Comments:

What I liked about this class:

What I did not like about this class:

. And furthermore....

Appendix C

Date

Name
Title
Address
City, State, Zip

Dear name:

Thank you for your affirmative response to my questionnaire on group project activities. Due to the many responses received, I have had to limit, to a small number, those schools that I can visit personally.

Since I will be unable to visit your school and observe first hand its group project activity, I am asking you and your class to take some time to fill out the enclosed forms. This information will be of great value in appraising the value of group project activity.

Enclosed is a copy of the completed questionnaire I received on your group project activity. I have also enclosed two different questionnaires, one to be filled out by you, the instructor, and one to be filled out by the students.

Your cooperation in the matter will be most appreciated. A postage paid, addressed envelope is provided for your convenience.

Sincerely yours,

Keith Myers
Graduate Research Assistant
Center for Vocational, Technical
and Adult Education

KM:mjc

Enclosures

Center for Vocational, Technical and Adult Education
UW-Stout
March 27, 1974

GROUP PROJECT ACTIVITY PARTICIPATION
(To be filled out by the student)

As a student who is being subjected to learning in what we call a group project activity, you can make some very important observations as to what is going on and if it is worthwhile.

I would like you to answer the statements below by circling the one response that best shows the way you feel. An example is provided:

Key: SA - Strongly Agree
A - Agree
U - Uncertain
D - Disagree
SD - Strongly Disagree

Example: SA A U D SD

I am having fun in this class.

This response indicates that the individual agrees with the item stated. Please complete the questionnaire.

-
- | | |
|-------------|--|
| SA A U D SD | 1. I'm having fun in this class. |
| SA A U D SD | 2. I'm learning the subject being taught. |
| SA A U D SD | 3. The work in the classroom is a lot like it will be out in the real world. |
| SA A U D SD | 4. The teacher in this class shows more interest in me than other teachers. |
| SA A U D SD | 5. I'm kept busy. |
| SA A U D SD | 6. The class discipline is good. |
| SA A U D SD | 7. I would rather work by myself. |
| SA A U D SD | 8. I learn from the whole group, not just my teacher. |
| SA A U D SD | 9. I'm learning a lot about a possible future career. |
| SA A U D SD | 10. I think I'm learning more in here than if I were in a "regular" class. |

Appendix D

Date

Name
Title
Address
City, State, Zip

Dear name:

Thank you for your affirmative response to my recent questionnaire on group project activities. I would like to observe and administer a pre- and post-test to your students involved in constructing the storage building.

To facilitate this I would like some additional information from you. Please refer to the attached Information Check List. A reply envelope is also provided for your convenience.

Once the pre- and post-tests are complete, a visitation date will be arranged. Should you have any questions, feel free to contact me.

Sincerely yours,

Keith Myers
Graduate Research Assistant
Center for Vocational, Technical
and Adult Education

KM:mjc

Attachment

CENTER FOR VOCATIONAL, TECHNICAL AND ADULT EDUCATION
UNIVERSITY OF WISCONSIN-STOUT

Group Project Activity
Information Check List

To help me in developing a pre- and post-test for your particular class and group project activity, I would appreciate a copy of any of the following information you might have or can provide:

- ☐ Course outline
- ☐ Course description
- ☐ Class objectives
- ☐ Student performance objectives
- ☐ Major tests you use for this class (such as finals, mid-terms or pre-tests)
- ☐ The number of students presently involved
- ☐ Days per week class meets
- ☐ Hour and time of day class is in session
- ☐ Name and author of textbook used
- ☐ Grade or age of students
- ☐ Average prior student experience

Please return to:

Keith Myers
Graduate Research Assistant
Center for Vocational, Technical
and Adult Education
University of Wisconsin-Stout
Menomonie, Wisconsin 54751
Telephone: (715) 232-1126

CENTER FOR VOCATIONAL, TECHNICAL AND ADULT EDUCATION

UNIVERSITY OF WISCONSIN-STOUT

Research Title: An Appraisal of Group Project Effectiveness in Vocational Subjects

In vocational education there is always a need for realistic learning experiences. Since these learning experiences are designed to prepare the student for work, it would seem that they should be designed to replicate real-life activities in the work world. Group learning activities are one type of learning experience that can provide a real-life work situation in the classroom. Group learning activities in vocational education may prove to be of significant teaching value to the teacher, as well as a meaningful way of learning for the student.

- Keith R. Myers

Objectives of Study:

1. To determine the impact of group learning activities on the attainment of course objectives.
2. To determine the palatability for students and teachers of group project activity as a learning experience.
3. To determine if the student receives career information; performance beyond the course criterion level; and knowledge of group interaction through group project activities.
4. To determine those skills needed by the instructor to manage a group project activity.

Appendix E

Date

Name
Title
Address
City, State, Zip

Dear name:

Enclosed are questionnaires that I would like to have completed by your students in building construction. Please stress to your students the importance of responding to each question twice; once in regard to how they think they would have responded at the beginning of this class and again with regard as to how they feel now. Any statements they would like to make about the class are welcome and can be written at the end of the questionnaire or on the back. A questionnaire which I would like you, the instructor, to respond to is also enclosed.

There is no need to return the questionnaires as I will be visiting your school in May and can pick them up at that time. I will also be asking you for any final comments, suggestions, and/or observations you may have on group project learning.

Sincerely yours,

Keith R. Myers
Graduate Research Assistant
Center for Vocational, Technical
and Adult Education

KRM:mjc

Enclosures

Appendix F

Center for Vocational, Technical and Adult Education
UW-Stout
March 27, 1974

GROUP PROJECT ACTIVITY MANAGEMENT
TASK ANALYSIS QUESTIONNAIRE
(To be filled out by instructor)

Instructor _____ Activity _____

School _____ Address _____

It is presumed that in order for an instructor to successfully manage a group project activity that instructor needs to be skillful in a variety of tasks.

I would like you to answer the statements below by circling the one response that best shows the way you feel. An example is provided:

Key: VI - Very Important
I - Important
U - Uncertain
UI - Unimportant
NN - Not Needed

Example: VI I U UI NN

Ability to write behavioral or performance objectives.

This response indicates that the individual thinks the item is important. Please complete the questionnaire.

-
-
- | | |
|--------------|---|
| VI I U UI NN | 1. Ability to write behavioral or performance objectives. |
| VI I U UI NN | 2. Previous teaching experience. |
| VI I U UI NN | 3. Skill in subject matter of the group project activity. |
| VI I U UI NN | 4. Ability to organize students. |
| VI I U UI NN | 5. Public speaking ability. |
| VI I U UI NN | 6. A lot of patience. |
| VI I U UI NN | 7. A thorough understanding of group project activity. |
| VI I U UI NN | 8. Ability to develop or modify curriculum. |
| VI I U UI NN | 9. The desire to work as part of a team. |

- | | |
|--------------|---|
| VI I U UI NN | 10. Ability to teach and learn in an informal atmosphere. |
| VI I U UI NN | 11. Above average teaching skills. |
| VI I U UI NN | 12. A complete commitment to the activity. |
| VI I U UI NN | 13. |
| VI I U UI NN | 14. |
| VI I U UI NN | 15. |

Please return to: Keith R. Myers
Graduate Research Assistant
Center for Vocational, Technical and Adult Education
UW-Stout
Menomonie, Wisconsin 54751

Appendix G

Date

Name

Address

City, State, ZipCode

Dear Sir:

I would like to take this opportunity to express my sincerest appreciation to you and your students for the assistance I received in my research efforts. I am sure the results of this research will be very valuable to vocational educators and administrators.

When all the results are in and analyzed, the final report will be written and published sometime in late summer. As a participant, you will receive a copy of my research paper.

Should you wish the report sent to an address other than the above, please make a note of it and return this letter in the business reply envelope provided.

Again, thank you for your help.

Sincerely yours,

Keith R. Myers
Graduate Research Assistant
Center for Vocational, Technical
and Adult Education

nag

Appendix H

Group Project Activity
Schools Identified

Bay View High School
2751 South Lenox
Milwaukee, Wisconsin 53207
Instructors: Mr. A. Anderson
and Mr. M. Tibbetts
Activity: Aircraft

Blackhawk Technical Institute
Rock County Airport
Janesville, Wisconsin 53545
Instructors: Mr. Graham L. Smith
and Mr. Archie Henkelmann
Activity: Airplane

Bloomer High School
1310 17th Avenue
Bloomer, Wisconsin 54724
Instructor: Mr. Peterson
Activity: Storage Building

Cochrane - Fountain City High School
Fountain City, Wisconsin 54629
Instructor: Mr. Barry Nelson
Activity: House

Darlington High School
Center Hill Road
Darlington, Wisconsin 53530
Instructor: Mr. James M. Discher
Activity: Garage

Heartland Vocational Center
Pine River High School
Pine River, Minnesota 55475
Instructor: Mr. Curtis Johnson
Activity: Cabin

Lakeshore Technical District
843 Jefferson Avenue
Sheboygan, Wisconsin 53081
Instructors: Mrs. Kathy Carney
and Mrs. Eva Repphun
Activity: Men's Clothing and
Garment Alternations

Lakeshore Technical District
843 Jefferson Avenue
Sheboygan, Wisconsin 53081
Instructor: Mrs. Mary Denison
Activity: Operation of Nursery
School

Madison Area Technical College
2125 Commercial Avenue
Madison, Wisconsin 53703
Instructor: Mr. B. Whitt
Activity: Wood Construction
Projects

Mid State Technical Institute
110 W. Third Street
Marshfield, Wisconsin 54449
Instructor: Mr. Larry Van
Handel
Activity: Camper

Milwaukee Technical High School
319 West Virginia Street
Milwaukee, Wisconsin 53204
Instructor: Mr. T.J. Teschendorf
Activity: Aircraft

North Central Technical Institute
1000 Schofield Avenue
Wausau, Wisconsin 54401
Instructors: Ms. Pat Schoenherr
and Mr. Gerald Hoover
Activity: Marketing

North Central Technical Institute
1000 Schofield Avenue
Wausau, Wisconsin 54401
Instructor: Ms. Pat Schoenherr
Activity: Production of Tele-
vision Commercials

Nicolet College & Technical Inst.
Rhineland, Wisconsin 54501
Instructor: Mr. G. Cummings
Activity: Houses

Group Project Activity (continued)

Northwestern High School
Maple, Wisconsin 54854
Instructor: Mr. William Dirks
Activity: 24' x 44' House

Oshkosh West High School
375 North Eagle Street
Oshkosh, Wisconsin 54901
Instructor: Mr. S. C. Scoville
Activity: Airplane

Seymour Community High School
10 Circle Drive
Seymour, Wisconsin 54165
Instructors: Mr. Herbst, Ms. Winteredlt,
Mr. Kenny, and Mr. Giachino
Activity: Forming Enterprise, Operate A
Corporation and Make Products

Seymour Community High School
10 Circle Drive
Seymour, Wisconsin 54165
Instructor: Mr. Krueger
Activity: Constructed a House

University of Wisconsin-Stout
Menomonie, Wisconsin 54751
Instructors: Dr. Henry Thomas and Dr. Ken Heintz
Activity: Spinning Wheels

Waukesha County Technical Institute
800 Main Street
Pewaukee, Wisconsin 53072
Instructors: Mr. Lavin, Mr. Tess,
and Mr. Schormack
Activity: Marketing Seminar

Appendix I

QUESTION CHECK LIST FOR SCHOOLS VISITED

School _____ Date _____

1. Observations of progress based on course objectives.
2. Work being done at present.
3. Observations on group cohesiveness. (Positive and Negative)
4. Talk with instructor.
 - a) How is group project progressing in terms of work accomplished?
 - b) What have been some of the group problems? Group solutions?
 - c) Do you feel group project activity is working?
 - d) If so, how does it work? What makes it go?
 - e) What seems to motivate students? What disrupts the group?
 - f) Would you use it again? What would you change?
 - g) What would you recommend to teachers starting group project activities?
 - h) Any additional comments you would like to make with regard to group project activities?